ABSTRACT
M Sc Thesis

INVESTIGATION OF IMMOBILIZATION CONDITIONS OF UREASE ON Ca-ALGINATE

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Immobilization is a term used fort the entrapment of an biologically active catalysts in a reactor or in an analytical system. Immobilized complex exhibits the physical characteristics of the solid support along with essential biochemical activity of the catalyst. Immobilization allows the fluid flow easily by building a nonsoluble complex on a special module. Thus, it converts the substrate into product by the help of a controlled enzyme reaction. In other words, immobilization is the application of heterogen catalyst principles to biological systems.

In this work, the immobilization of soy bean and Jack Bean urease onto natural alginate polymer was investigated. After the ideal alginate and calcium chloride concentrations were determined, the differentiation of kinetic parameters of the free and immobilized enzymes were investigated. Soy bean urease had lower V_{max} and K_m values after immobilization. On the other hand, Jack Bean urease had lower V_{max} but higher K_m after immobilization. Optimum pHs of free and immobilized soy bean urease were identical (pH 7,0), whereas optimum pH of the immobilized Jack Bean urease demonstrated 1,0 pH unit shift to the alkaline region compared to the free enzyme.

Both soy bean and Jack Bean urease's optimum temperature did not show any differentiation after immobilization. As for storage stability, it was determined that, after 30 days, immobilized Jack Bean and soy bean ureases retained 56,7 % and 59,0 % of their initial activity, respectively. These results varified that immobilization enhances enzyme stability to a great extent. Urease immobilized alginate microbeads were used to measure the amount of urea in urine and dermatological preparate and the results varified that there are no significant differences between the free and immobilized enzyme activities.

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Key Words:

Urease, alginate, immobilization, soy bean, Jack Bean